

REMARKS

Applicant wish to thank the Examiner for the courtesies extended to the undersigned during the telephonic interview of August 8, 2002. It was agreed during the telephonic interview that Applicants would submit this response.

Applicant adds new claims 62-66. Claims 31-42 and 54-66 are pending in the present application. Claims 36, 58 and 59 are indicated to recite allowable subject matter. Applicants appreciate the recognition of patentable subject matter in the present invention.

Claims 31-33, 35, 37-42, 54-55 and 60-61 stand rejected for anticipation U.S. Patent No. 4,937,653 to Blonder et al. Claims 34 and 57 stand rejected for obviousness over Blonder. Claim 56 stands rejected for obviousness over Blonder in view of Reid.

Applicants respectfully traverse the rejections and urge allowance of the present application.

Under section 4 on pages 2 and 3 of the Office Action, it is stated that Blonder anticipates claim 31. In particular, the Office Action states that Blonder anticipates a removable electrical interconnect apparatus for removably engaging electrically conductive pads on semiconductor substrate without identification of specific reference teachings of Blonder to support the assertion. Blonder relates to formation of permanent connections between a chip and a carrier. For example, the abstract of Blonder clearly recites connection of pads on a chip to pads on a carrier by compression bonding including cold-weld bonding. As recited in the technical field in column 1 of Blonder, Blonder is related to schemes for interconnecting one IC chip to a chip-carrier which is directly contrary to providing removable interconnects. In column 2, lines 42-45 of Blonder, it is stated that

bonding of carrier pads to chip pads is provided by a bonding process comprising cold-welding or cold-weld bonding that is welding or bonding by means of compression at room temperature. Provision of welding and bonding of the pads of the chip and the carrier results in a permanent connection and in no fair interpretation discloses a removable electrical interconnect apparatus.

In column 3, lines 3-8 of Blonder, it is stated that a sufficiently strong gold-to-gold bond is attributable to penetration through foreign matter coating the surfaces of the gold. Teachings with respect to the embodiment of Figs. 5-7 of Blonder are cited as anticipating claim 31. Teachings with respect to such figures clearly illustrate the permanent bonding operations of Blonder and clearly demonstrate Blonder does not disclose a removable electrical interconnect apparatus. Referring to the teachings in column 6, line 62 spanning to the teachings in column 7, line 17 of Blonder, it is stated that mechanical compression is applied to bond chip 101 and carrier 10 and followed by a slight mechanical pulling sufficient to produce a vertical spacing Y shown in Fig. 7 illustrating the previously permanent bond formed. Such teachings illustrate Blonder is concerned with permanent connections. Starting at line 8 of column 7 of Blonder, it is stated that the structure of Fig. 7 has the added advantage of relative freedom from strains in the lateral direction evidencing the permanent nature of the connection. It is stated that the structure promises to withstand such strains, and for even greater mechanical strength, nickel plated with gold can be used as material for chip pad 24.

The express teachings of Blonder concern permanent connections between a chip and a carrier and fail to disclose or suggest an engagement probe having an outer surface

comprising an apex in the form of at least one knife-edge line configured to remotely engage a single conductive pad of the substrate comprising operable integrated circuitry and to removably engage a single conductive pad of another substrate also comprising operable integrated circuitry. Positively-recited limitations of claim 31 are not shown or suggested in the prior art and claim 31 is allowable.

The claims which depend from independent claim 31 are in condition for allowance for the reasons discussed above with respect to the independent claim as well as for their own respective features which are neither shown nor suggested by the cited art.

Referring to claim 32, it is stated in the Office Action that Blonder further anticipates the engagement probe formed on a projection and the Office Action recites interior of triangular shaped objects shown in Figs. 6-7 as allegedly corresponding to the claimed projection. Claim 31 recites the engagement probe projecting from the substrate and having an outer surface comprising an apex in the form of at least one knife-edge line and claim 32 specifies that the engagement probe is formed on a projection from the substrate. The single unitary triangular shaped objects shown in Figs. 6-7 are identified as allegedly corresponding to both the engagement probe having the outer surface comprising an apex as well as the projection upon which the engagement probe is formed. The teachings on page 2 of the Action, identified as allegedly corresponding to the engagement probe, include the surface of triangular shaped objects shown in Figs. 6-7. The surfaces in no fair interpretation by themselves disclose the claimed engagement probe, and accordingly, the Office relies upon the interior triangular members as allegedly disclosing both the claimed engagement probe and the claimed projection. The single unitary triangular structures fail

to disclose or suggest the engagement probed formed on a projection from the substrate.

There is no structure in Blonder which discloses or suggests the engagement probe formed on a projection from the substrate as recited in accordance with claim 32. Claim 32 recites limitations which are not shown or suggested in the prior art of record and claim 32 is allowable for at least this reason.

Referring to claim 34, on page 6 of the Action, it is stated that claim 34 is obvious and the modification does not provide any unexpected, or non-obvious result and would have been one of numerous parameters chosen by the ordinary skilled artisan during routine experimentation. Applicants disagree with the obviousness rejection of claim 34.

An "unexpected or nonobvious result" is not the proper test for establishing a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See, e.g., MPEP §2143 (8th ed.). If the Examiner does not produce a *prima facie* case, the Applicant is under no obligation to submit evidence of non-obviousness. Since the Examiner relies on improper factual support (does not provide any unexpected, or nonobvious result) to allegedly establish the *prima facie* obviousness rejection, the rejection must fail. Additionally, since the Examiner has not come forward with facts supporting any *prima facie* conclusion of obviousness, which the above authority states is the Examiner's initial burden, the rejection

must fail for at least this reason.

Further, "routine experimentation," if it still exists, is a very narrow doctrine dealing with the obviousness of experimentation to determine optimal or workable ranges of physical characteristics of materials: *temperature and concentration*. MPEP 2144.05 IIA (see *In re Aller, Lacey, and Hall*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955); see also *In re Swain and Adams*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412, 415).

Claim 34 does not recite a limitation concerning temperature or concentration, and therefore, the rejection against claim 34 based on routine experimentation is inappropriate and should be withdrawn.

Claim 34 stands rejected under 35 USC §103(a) for obviousness over a single reference. If claim 34 is not found to be allowable, and pursuant to §2144.03 of the M.P.E.P. (8th ed.), Applicants hereby request the submission of an affidavit in support of the rejection or identification of prior art which discloses the features not found in the single reference and which is properly combinable with the reference.

Claim 54 recites a removable engagement probe wherein a knife-edge line projects from a penetration stop plane. Claim 54 is patentable over the prior art of record.

As discussed above, Blonder is concerned with permanent connections of a chip to a carrier and fails to disclose or suggest a removable engagement probe as recited in claim 54. Claim 54 recites limitations not shown or suggested in the prior art of record and claim 54 is allowable for at least this reason.

Blonder also fails to disclose or suggest the knife-edge line projecting from a penetration stop plane as recited in claim 54. Teachings are identified on page 5 of the

Office Action which allegedly disclose limitations of claim 54. The Office Action recites a penetration stop plane as being disclosed approximate surface 13. Surface 13 fails to disclose or suggest the claimed penetration stop plane.

In the embodiment shown in Figs. 1-3, the height of pads 24, 34 prevent carriers 101, 102 from contacting a surface adjacent 13. Indeed, Fig. 3 shows voids within the V-shaped grooves illustrating the fact that pads 24 do not extend downwardly to the bottom of the V-shaped grooves and surface 13 is not a stop plane. Referring to the embodiment in Figs. 5-7, the engaged pads 24 with carrier 10 as shown in Fig. 7 includes voids and do not contact surface 13 illustrating that the surface adjacent 13 fails to disclose or suggest a penetration stop plane or a knife-edge line projecting from a penetration stop plane. Positively recited limitations of claim 54 are not shown suggested in the art and claim 54 is allowable for at least this reason.

The claims which depend from independent claim 54 are in condition for allowance for the reasons discussed above with respect to the independent claim as well as for their own respective features which are neither shown nor suggested by the cited art.

For example, claim 56 stands rejected for Office Action over Blonder and Reid. It is stated on page 7 of the Office Action that it would have been obvious to combine the teachings of Blonder with Reid because both teach the forming of a silicon substrate into a structure comprising a plurality of triangular shaped objects having electrically conductive apexes for contacting a pad or pads of a semiconductor device. Applicants disagree with the rejection of claim 56 and claim 56 is allowable over the prior art record.

Referring to MPEP §2143.01 (8th ed.), there must be some suggestion or motivation,

either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine reference teachings. The motivation for forming the combination must be something other than hindsight reconstruction based on using Applicant's invention as a roadmap for such a combination. See, e.g., *Interconnect Planning Corp. v. Feil*, 227 USPQ 543, 551 (Fed. Cir. 1985); *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990).

Proper obviousness rejections require motivation for one of skill in the art to combine reference teachings. The mere fact that two references may relate to similar technology or have similar purposes or uses fails to provide the appropriate motivation to combine reference teachings. There is no evidence Blonder or Reid fails to operate for its intended purpose or is otherwise deficient to compel someone to look for additional reference teachings. There is no evidence that combining reference teachings would cure any deficiencies.

The relatedness of the subject matter of the references is insufficient motivation to combine the reference teachings in support of the 103 rejection. Indeed, the mere fact that references *can* be combined or modified does not render the resultant combination obvious *unless the prior art also suggests the desirability of the combination*. MPEP §2143.01 citing *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

There is absolutely no desirability or other motivation to combine the teachings of Reid with the teachings of Blonder without the use of Applicants' disclosure. However, the motivation for forming a combination of references or modification thereof must be something other than hindsight reconstruction based on using the Applicants' invention as

a roadmap for such a combination or modification. See, e.g., *Interconnect Planning Corp. vs. Feil*, 227 USPQ 543, 551 (Fed. Cir. 1985); *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990). Knowledge of Applicant's disclosure must be put aside in reaching a determination whether the claimed invention "as a whole" would have been obvious at the time when the invention was made. MPEP §2142, (8th edition); see also MPEP §2143, (8th edition).

The fact that references may be directed to related subject matter is insufficient. No motivation exists for the combination, and accordingly, the Examiner has improperly relied upon teachings of Applicants' disclosure to arrive at the 103 rejection. The obviousness rejection of claim 56 is improper for at least this reason and Applicants respectfully request allowance of claim 56 in the next action.

Claim 66 includes limitations of claims 31 and 36 and is allowable in view of the statements in the Office Action:

Applicants request initialization of the copies of the non-initialed and previously submitted forms PTO-1449.

Applicants submit a Supplemental Information Disclosure Statement herewith.

Applicants submit an Interview Summary herewith.


Applicants respectfully request allowance of all pending claims.

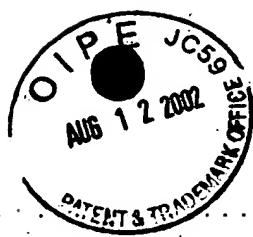
The Examiner is requested to phone the undersigned if the Examiner believes such would facilitate prosecution of the present application. The undersigned is available for telephone consultation at any time during normal business hours (Pacific Time Zone).

Appl. No. 09/844,175

Respectfully submitted,

Dated: 8/12/02

By: 
James D. Shaurette
Reg. No. 39,833



Application Serial No. 09/844,175
Filing Date April 27, 2001
Inventorship Warren M. Farnworth et al.
Assignee Micron Technology, Inc.
Group Art Unit 2858
Examiner R. Kobert
Attorney's Docket No. MI22-1703
Title: Removable Electrical Interconnect Apparatuses and Removable Engagement Probes

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING
RESPONSE TO MAY 10, 2002 OFFICE ACTION

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

31. (Twice Amended) A removable electrical interconnect apparatus for removably engaging electrically conductive pads on a semiconductor substrate having integrated circuitry fabricated therein, the apparatus comprising:

a substrate; and

an engagement probe projecting from the substrate to engage a single conductive pad on a semiconductor substrate having integrated circuitry formed in the semiconductor substrate, the engagement probe having an outer surface comprising an apex in the form of at least one knife-edge line ~~and positioned to extend elevationally above a surface of the substrate to~~ configured to removably engage the single conductive pad of the substrate comprising operable integrated circuitry and to removably engage another single conductive pad of another substrate also comprising operable integrated circuitry.

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Form PTO-1449

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LIST OF AN APPLICANT
(Use several sheets if necessary)

ATTY. DOCKET NO.
MI22-1703

SERIAL NO.
09/844,175

APPLICANT
Warren M. Farnworth et al.

FILING DATE
April 27, 2001

GROUP
2858

U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
AA	4,566,184	1/86	Higgins et al.			
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Document Number	Date	Country	Class	Subclass	Translation	
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Warren M. Farnworth et al.FILING DATE
April 27, 2001GROUP
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Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
AA	6,093,643	7/25/00	Akram			
AB						
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AA	6,002,266	12-99	Briggs et al.			
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MI22-1703PRIORITY SERIAL NO.
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October 1, 1999PRIORITY GROUP
2858

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AA	4,105,970	08/1978	Katz			
AB	4,141,055	02/1979	Berry et al.			
AC	4,182,781	01/1980	Hooper et al.			
AD	4,189,825	02/1980	Robillard et al.			
AE	4,312,117	01/1982	Robillard et al.			
AF	4,417,206	11/1983	Stowers			
AG	4,499,656	02/1985	Fabian et al.			
AH	4,585,991	04/1986	Reid et al.			
AI	4,881,118	11/1989	Niwayama et al.			
AJ	4,924,589	05/1990	Leedy			
AK	4,929,999	05/1990	Hoeberechts et al.			

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AL	329314	08/89	European			
AM	57143838	09/82	Japan			
AN	2-5540	01/90	Japan			
AO	2232946	09/90	Japan			
AP	53171	03/91	Japan			

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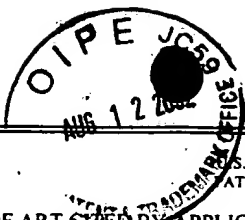
AR	Motoo Nakano, "A Probe for Testing Semiconductor Integrated Circuits and a Test Method Using Said Probe", 25 March 1991, Japanese Patent Office Disclosure No. Hei 3-69131, Filing No. Hei 1-205301, filing date 8 August 1989.
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	AB	4,952,272	08/1990	Okino et al.		
	AC	4,963,225	10/1990	Lehman-Lamar		
	AD	5,014,161	10/1990	Lee et al.		
	AE	5,032,541	07/1991	Sakamoto et al.		
	AF	5,045,780	09/1991	Swart		
	AG	5,072,116	12/1991	Kawade et al.		
	AH	5,103,557	04/1992	Leedy		
	AI	5,137,461	08/1992	Bindra et al.		
	AJ	5,177,438	01/1993	Littlebury et al.		
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AL	108350	05/91	Japan			
AM	440446	01/92	Japan			
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Warren M. Farnworth et al.

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AF	5,326,428	07/1994	Farnworth et al.			
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AC	4,315,984	02/16/82	Okazaki et al.			
AD	5,196,251	03/23/93	Bakhru et al.			
AE	5,235,140	08/10/93	Reele et al.			
AF	5,239,260	08/24/93	Widder et al.			
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AB	5,478,779	12/26/95	Akram			
AC	5,559,444	09/24/96	Farnworth et al.			
AD	5,625,297	04/29/97	Arnaudov et al.			
AE	5,716,218	02/10/98	Farnworth et al.			
AF	5,790,377	08/04/98	Schreier et al.			
AG	5,831,832	11/03/98	Gillette et al.			
AH	5,849,633	12/15/98	Akram			
AI	5,869,787	02/09/99	Akram			
AJ	5,471,151	11/28/95	DiFrancesco			
AJ	5,420,520	5/30/95	Anschel et al.			
AK	5,541,525	7/1996	Wood et al.			

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